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INFORMATION AND OUTDOOR RECREATION RESEARCH

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ABSTRACT: The scientific information needs of outdoor recreation research are considered in light of some existing and future methods of information acquisition, storage, and retrieval. Some basic questions on the nature and direction of research are posed as a first step toward building an improved information system.

Research in outdoor recreation, as in other growing fields of study, is experiencing an "information crisis." That is, it is becoming increasingly difficult to stay abreast of developments in policy, administration, and science relevant to research programs. Research reports, staff studies (such as the Outdoor Recreation Resources Review Commission Reports), newsletters, and correspondence all strengthen the research base. But the proliferating sources overtax present systems of handling information.

A brief review of Ulrich's Directory of Periodicals revealed more than a hundred journals and magazines pertinent to recreation activities or relevant scientific disciplines. This information is not pulled together in any one source but is scattered through at least 8 indices, such as the Reader's Guide or the Applied Science and Technology Index, and 13 abstracting and reviewing services, such as Forestry Abstracts, Economic Abstracts, or Behavioral Science.

What are the problems of using and building upon this growing body of knowledge? What are the opportunities for improvement?

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Interest in the information crisis has been spurred not only by the magnitude of the problem, but by the opportunities--some of them very new--for problem solution. A wide range of methods are available, extending from a calculated aversion to mechanization to multimillion dollar electronic scanning, indexing, and memory devices.

The cluttered desk method.--This is useful to the individual researcher if (a) he has a knack for knowing what kinds of information will be useful, (b) he has a reasonably good memory, (c) he does not require large quantities of statistical data, and (d) he is available for information exchange on a personal basis. This method avoids the problem of having vast, well-organized files on unimportant things, but has obvious shortcomings for certain kinds of research.

Simple card file and file cabinet.--This method allows for the careful documentation of interesting literature and an orderly way of storing documents. It requires some time and discipline to keep up to date, and like the cluttered desk, often depends heavily on the memory of the person filing the material.

Edge-notch cards.--Key Sort, Zator, E-Z Sort, and other cards have been used for years. They require no special equipment other than an inexpensive punch and needle. References must be classified according to some numerical code, so this method is most useful for a taxonomic classification--less useful when a loosely defined subject material must be classified. The method is probably not worthwhile for less than 100 cards and may break down when a large number (say 4,000 to 5,000 cards) must be searched at any one time.

Film-card systems.--File Search, Rapid Selector, Film-Sort, Minicard, and similar systems contain space for a microfilm copy of the document or abstract to be placed on the index cards. The disadvantages of these are that many documents are worth saving but are not worth microfilming, and that the photographic and reading equipment is costly. However, they can be useful when a large number of documents in full form must be held available, and where ease of duplications is important. Cards may be sorted manually or by mechanical data processing equipment. Minicards (Kodak) consist of small bits of film (0.6 x 1.3 inches) holding both index information and up to 12 document pages at one-sixtieth of their original size. A file can be searched at 1,800 cards a minute, and cards automatically duplicated or dropped out for examination full size on a reader. A complete setup (as installed for the Air Force or the Central Intelligence Agency) contains 13 separate photographic, electrical, optical, and mechanical units, and costs between 2-1/2 and 3-1/2 million dollars.

Electronic computer indexes.--Computers show promise for very large and complicated libraries where complex search problems must be handled. The computer can be fed a fairly long list of key words or

symbols for rapid scanning of the library collection. Such methods have a strong potential for a field such as outdoor recreation research, where great quantities of information must be screened for a few relevant items. Eventually, most major university and government libraries might have compatible computer-based indexing and retrieval systems. As these are tied together, one might be able to search simultaneously the Library of Congress, the USDA Library, and the collections of several major universities.

Computer scanning devices.--If the researcher can identify his work with a relatively few key words or phrases, computers may take over much of the sometimes laborious job of scanning and indexing. The Intelligent Machines Research Corporation (Harrington Mfg. Co.) and others are developing a program for reading not only titles, but entire pages of documents in order to analyze and index according to key words occuring in the text.

Only a very few representative methods could be presented here. The fields of electronic data processing and information retrieval are growing so rapidly that some research organizations have information or documentation specialists working full time to keep abreast.

THE INFORMATION PROBLEM IN OUTDOOR RECREATION RESEARCH

The new and expensive methods hold exciting potential, but they are not necessarily the best answer to information problems in forest recreation research. On the other hand, researchers have the responsibility to meet future research challenges with the very best methods available, even if this means working at new levels of operation and "thinking big." To help solve this dilemma it is necessary to consider some distinctive features of information handling within the context of outdoor recreation research. These features set the limits of applicability for new methods.

The problems lie in becoming aware of current happenings, in screening large numbers of documents for the few relevant ones, in classifying documents so that the indexer and others may locate them easily, and in providing for efficient storage and retrieval.

Keeping Aware

Part of this problem is the ability to search the "world knowledge" for a given kind of data. For example, a researcher might wish to ascertain the research methods used in tourist-recreation surveys, no matter where or when they were conducted. Here, the researcher knows what kind of information he wants, but not exactly what is available or where it is located. He needs an indexing and abstracting service like Wildlife Review or Sociological Abstracts. Presently, no comprehensive service of this kind really meets the needs of outdoor recreation research.

Another type of "keeping aware" occurs when the researcher does

not know exactly what he wants, but is looking for leads into developments in academic disciplines or technologies which bear on outdoor recreation. This problem has been met in other fields through devices such as "Current Contents in the Chemical, Pharmico-Medical, and Life Sciences." This publication gets advance or early information on tables of contents, and each week shows the title pages of about 115 journals. It covers more than 600 journals, and reports about 125,000 individual articles per year. Separate series cover the space sciences and social sciences. It is possible that such a service could be extended to cover natural science, regional science, and resource management and development. Researchers interested in outdoor recreation perhaps should actively encourage such a publication in these fields.

Still another important contribution to awareness comes through serendipity (recall Walpole's "The Three Princes of Serendip" who in their travels found valuable things they were not seeking). There is reason to believe that chance finds in cluttered library stacks underlie a good deal of creative research. Automated retrieval systems do not now take full account of this process; yet it must be relied upon and should be encouraged in the outdoor recreation research field.

Screening

The ability to select relatively few items of special significance out of great quantities of information is a salient part of creative research. Screening is thus essentially a subjective process, but new research tools, such as computer scanning devices, may enable the researcher to mechanize and greatly extend his scope of literature review. Much as present methods of screening seem to consist of looking for key names, theories, specialized terms, or jargon, the future automatic systems will require explicit key words and phrases.

To take advantage of new methods (and to improve present procedures), perhaps recreation scientists should begin now to identify important topics with meaningful descriptors, and to use these in publications. We already have some, such as: "recreation complex," "visitor-day," and "activity."

Indexing

The problem of "where to file it and how to list it" is especially perplexing in recreation studies. Many researchers are used to hierarchical classification systems (such as the Dewey decimal system) and are now having trouble fitting recreation literature into the right compartments. Hierarchical or subject heading systems are most useful where theory is well accepted and widely known. For instance it is relatively easy for the taxonomic botanist to index and cross-reference a new observation so that he and other botanists can relocate it. All botanists have much the same grounding in basic taxonomy.

Not so in the frontier field of recreation research, in which there

is as yet no established common theory. Here the coordinate indexing system may be more applicable. Rather than placing the document within a subject category, the indexer would list the document under a variety of terms to signal the attention of economists, ecologists, foresters, or others expected to be searching out a given subject. A problem with coordinate indexing comes in assigning a few terms from the text (Uniterms) to adequately describe the contents. Coordinate systems have worked best for describing things--chemical formulas, patents, or machine parts; but apparently have not yet proved amenable to indexing concepts--recreation complex, the effects of recreation activity on natural environment, multiple use conflicts, and so on.

There seem to be two avenues of progress in indexing outdoor recreation literature: (1) development of a common theory upon which a hierarchical classification could be built, or (2) development of the ability to specify research interests with a standard vocabulary of simple terms that could serve as descriptors or Uniterms. If neither of these proves feasible, we may have to make do with ad hoc subject headings.

Storage

Many new methods emphasize storage of entire documents in miniature form. Whether miniaturization should be taken into consideration depends on the present and eventual size of outdoor recreation collections, requirements for transporting references and documents, and the amount the organization is prepared to pay for ease and speed in retrieval.

The two polar types of indexing systems--hierarchical and coordinate--employ different storage techniques. In the hierarchical type, materials are stored under a prescribed skeletal framework or under subject headings. A document is grouped with other related materials. In coordinate indexing, items are stored in numerical order. One cannot find things by rummaging through the files.

Retrieval

Efficient retrieval raises a host of technical questions on the costs of speed and accuracy in access. A special problem is that we are not dealing with a central library but with materials that are scattered across the country in the libraries of research stations, agencies at various levels of government, and universities. The complete library network has not been identified, and there is as yet no comprehensive procedure for making the outdoor recreation contents of these libraries known. While this problem is common to many fields of study, it should be noted because so many of the successful projects in information storage and retrieval have dealt with self-contained libraries.

SOME BASIC QUESTIONS

Evidently, the information problem is not only complex, but is closely tied to research content and process. The kind of information

system needed depends directly on the kind of research organization one has or would like to promote. This raises some elemental questions about the nature of research in the outdoor recreation field.

Academic Orientation versus Problem Orientation

The academically oriented researcher asks "What can a given discipline (say economics or political science) contribute?" Usually, established theories or models are taken as guides, and research emphasizes modification and application of the model to whatever issues happen to be most amenable to study. The academician needs data to fill in the model, but generally his information demands tend to be relatively low.

Problem orientation places quite different demands on an information system. The issue for study is selected because of its importance, not because of its amenability to a given research technique, and the researcher should quickly survey many potentially relevant disciplines and technologies for helpful ideas, models, and data. If the problem is large and critical, information demands will probably be high. Although we know that most research falls between these two extremes, the future emphasis should be considered and trends toward either pole taken into account in designing the information system.

Multi-disciplinary versus Inter-disciplinary Research

Is the research organization a collection of specialists, or an integrated research team? In multi-disciplinary work, studies proceed on many fronts--each with its own particular mode of analysis. Basic work in sociology, ecology, public administration, or aesthetics might make basic contributions. However, policy makers and some researchers would be left with the job of integrating unmatched data, and resolving the sometimes conflicting interpretations of studies from different points of view. These information handling jobs are thus shifted from the research organization to those who will use the research results.

Inter-disciplinary work, on the other hand, attempts to integrate concepts, terms, and premises before and during research. Thus these information costs are borne by the instigating research organization, and a heavier investment in information and communication must be planned for.

Crisis versus the Long Pull

In a crisis or pre-crisis situation, it is probably worthwhile to invest heavily in information. If, on the other hand, the same recreation problems will be with us for a long time, then perhaps we can avoid the heavy extra costs of searching out and disseminating the latest information.

The Value of Extra Information

Eventually, each researcher must ask "What kinds of information do I need? What role does it play in my scheme of things? What portion of the research budget should be devoted to improvements? What adjustments in my personal information system would I be willing to make to assure compatability with larger systems, and to make my information available to others?"

Research directors need to consider the role of information systems in assisting or molding research programs. They must seek to understand and predict the role of information in a modern research organization.

In the final analysis, the value of information is directly related to the value of the research end product. This implies a continuing evaluation of the costs of inaction, the costs of making research mistakes, and the social benefits arising from research that is timely and pushed to the maximum use of knowledge.

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